IN THE CLAIMS:

Please AMEND claims 35-36, 39, 42, 45-46, 49, 52, 54-58, 71, 84-101, 110, and 119;

Please CANCEL claims 59-70, 72-83, 102-109, and 111-118, without prejudice or disclaimer; and

Please ADD claims 121-131, as shown below.

1-34 (Canceled)

35. (Currently Amended) A method ~~of transmitting a signal~~, ~~the method~~ comprising:

providing digital data to be transmitted to a remote station as a plurality of parallel bitstreams;

phase modulating said bitstreams with respective orthogonal or substantially orthogonal spectrum spreading signals to produce a plurality of modulating signals;

phase modulating respective instances of a carrier with said modulating signals to produce a plurality to modulated carrier instances; and

summing the modulated carrier instances and transmitting the result of said summation.

36. (Currently Amended) A method according to claim 35, ~~wherein~~ further comprising:

producing each spreading signal ~~is produced~~ by phase modulating a common finite spreading sequence with a respective cyclic signal, said cyclic signals being such that each completes an integer number of cycles in the duration of said spreading sequence.

37. (Previously Presented) A method according to claim 36, wherein said cyclic signals are substantially sinusoidal.

38. (Previously Presented) A method according to claim 37, wherein said cyclic signals are stepped sine waves, each step having the same duration as chips of said spreading sequence.

39. (Currently Amended) A method according to claim 35, wherein one of the spreading signals ~~is comprises~~comprises a finite spreading sequence, further comprising: ~~and~~

producing each of the other spreading signals ~~are each produced~~ by phase modulating said finite spreading sequence with a respective cyclic signals, said cyclic signals being such that each completes an integer number of cycles in the duration of said spreading sequence.

40. (Previously Presented) A method according to claim 39, wherein said cyclic signals are substantially sinusoidal.

41. (Previously Presented) A method according to claim 40, wherein said cyclic signals are stepped sine waves, each step having the same duration as chips of said spreading sequence.

42. (Currently Amended) A method according to claim 35, wherein at least one of said spreading signals comprises a ~~said~~ spreading sequence c[.] that is derived from a first code a[.] and a second code b[.] according to

$$c[n] = \left| a[0]\vec{b}, a[1]\vec{b}, \ldots, a[M-1]\vec{b} \right|.$$

43. (Previously Presented) A method according to claim 42, wherein the Fourier transforms of the first and second codes satisfy:

$s[t] \leftrightarrow S(e^{j\omega}) \neq 0$ for all ω

where s and S represent the first and second codes in the time and frequency domains respectively.

44. (Previously Presented) A method according to claim 35, wherein said bitstreams comprise bits of a single digital signal such that groups of bits of said single digital signal are transmitted in parallel.

45. (Currently Amended) A transmitter, comprising:

a source of digital data to be transmitted to a remote station as a plurality of parallel bitstreams;

a first ~~means for phase modulating~~phase modulating unit configured to phase modulate said bitstreams with respective orthogonal or substantially orthogonal spectrum spreading signals to produce a plurality of modulating signals;

a second ~~means for phase modulating~~phase modulating unit configured to phase modulate respective instances of a carrier with said modulating signals to produce a plurality to modulated carrier instances; and

a summer ~~for summing~~configured to sum the modulated carrier instances.

46. (Currently Amended) A transmitter according to claim 45, wherein ~~the first means~~the first phase modulating unit comprises ~~means for producing~~a production unit configured to produce each spreading signal by phase modulating a common finite spreading sequence with a respective cyclic signal, said cyclic signals being such that each completes an integer number of cycles in the duration of said spreading sequence.

47. (Previously Presented) A transmitter according to claim 46, wherein said cyclic signals are substantially sinusoidal.

48. (Previously Presented) A transmitter according to claim 47, wherein said cyclic signals are stepped sine waves, each step having the same duration as chips of said spreading sequence.

49. (Currently Amended) A transmitter according to claim 45, wherein ~~the first means~~the first phase modulating unit comprises ~~means for producing~~a production unit configured to produce one of the spreading signals by generating a finite spreading sequence and ~~producing~~ to produce the other spreading signals by phase modulating said finite spreading sequence with a respective cyclic signal, said cyclic signals being such that each completes an integer number of cycles in the duration of said spreading sequence.

50. (Previously Presented) A transmitter according to claim 49, wherein said cyclic signals are substantially sinusoidal.

51. (Previously Presented) A transmitter according to claim 50, wherein said cyclic signals are stepped since waves, each step having the same duration as chips of said spreading sequence.

52. (Currently Amended) A ~~tramsitter~~ transmitter according to claim 45, wherein at least one of said spreading signals comprises a ~~said~~ spreading sequence c[.] that is derived from a first code a[.] and a second code b[.] according to

$$c[n] = \left[a[0]\vec{b}, a[1]\vec{b}, \ldots, a[M-1]\vec{b}\right].$$

53. (Previously Presented) A transmitter according to claim 52, wherein the Fourier transforms of the first and second codes satisfy

$$s[t] \leftrightarrow S(e^{j\omega}) \neq 0 \text{ for all } \omega$$

where s and S represent the first and second codes in the time and frequency domains respectively.

54. (Currently Amended) A transmitter according to claim 45, wherein the source of digital data signals includes ~~means for generating~~a generation unit configured to generate said bitstreams from a single digital signal such that groups of bits of said ~~signal~~ single digital signal are transmitted in parallel.

55. (Currently Amended) A transmitter according to claim 54, wherein said ~~means for generating said bitstreams~~generation unit comprises a digital signal processor.

56. (Currently Amended) A transmitter according to claim 45, wherein ~~the first means~~the first phase modulating unit comprises a digital signal processor.

57. (Currently Amended) A transmitter according to claim 45, wherein ~~the second means~~the second phase modulating unit comprises a plurality of analog phase modulators.

58. (Currently Amended) A mobile phone including ~~a~~ the transmitter of claim 45~~, the transmitter comprising:~~

~~a source of digital data to be transmitted to a remote station as a plurality of parallel bitstreams;~~

~~first means for phase modulating said bitstreams with respective orthogonal or substantially orthogonal spectrum spreading signals to produce a plurality of modulating signals;~~

~~second means for phase modulating respective instances of a carrier with said modulating signals to produce a plurality to modulated carrier instances; and~~

~~a summer for summing the modulated carrier instances~~.

59-70 (Cancelled)

71. (Currently Amended) A base station of a mobile phone network including ~~a~~ the transmitter of claim 45~~ the transmitter comprising:~~

~~a source of digital data to be transmitted to a remote station as a plurality of parallel bitstreams;~~

~~first means for phase modulating said bitstreams with respective orthogonal or substantially orthogonal spectrum spreading signals to produce a plurality of modulating signals;~~

~~second means for phase modulating respective instances of a carrier with said modulating signals to produce a plurality to modulated carrier instances; and~~

~~a summer for summing the modulated carrier instances~~.

72-83 (Cancelled)

84. (Currently Amended) A method of receiving a signal produced by a method according to claim 35, the method comprising ~~the steps of~~:

producing a baseband signal, comprising components corresponding to the modulating signals, from a received ~~rf~~ radio frequency signal; and

processing the baseband signal by processes ~~adapted~~configured to extract the data from each of the modulating signals.

85. (Currently Amended) A method according to claim 84, ~~wherein~~ further comprising:

combining data bits extracted by said processes ~~are combined~~ into a single data signal.

86. (Currently Amended) A method according to claim 84, further ~~including~~ comprising:

mapping the outputs of said processes onto a transmitted parallel bit pattern using a maximum likelihood algorithm; and

outputting said parallel bit pattern.

87. (Currently Amended) A method according to claim 86, ~~wherein~~ further comprising:

combining data bits extracted by said processes ~~are combined~~ into a single data signal.

88. (Currently Amended) A method according to claim 84, wherein at least all but one of said processes comprises:

phase modulating the baseband signal by the inverse of a respective one of said cyclic signal to produce a first signal;

phase modulating instances of the first signal by respective cyclic signals of the form $e^{j2\pi nP/L}$ where P comprises the set of values in the range 0, ...,L-1, and L is the length of the second code to produce L second signals;

filtering each of said second signals with a filter having a transfer function ~~which~~that is the inverse of the first code to produce respective third signals;

correlating the third signals with corresponding reference signals; and

summing the results of ~~the said~~the correlations.

89. (Currently Amended) A method according to claim 88, ~~wherein~~ further comprising:

combining data bits extracted by said processes ~~are combined~~ into a single data signal.

90. (Currently Amended) A method according to claim 88, ~~including~~ further comprising:

mapping the outputs of said processes onto a transmitted parallel bit pattern using a maximum likelihood algorithm; and

outputting said parallel bit pattern.

91. (Currently Amended) A method according to claim 90, ~~wherein~~ further comprising:

combining data bits extracted by said processes ~~are combined~~ into a single data signal.

92. (Currently Amended) A receiver for receiving a signal produced by a method comprising providing digital data to be transmitted to a remote station as a plurality of parallel bitstreams, phase modulating said bitstreams with respective orthogonal or substantially orthogonal spectrum spreading signals to produce a plurality of modulating signals, phase modulating respective instances of a carrier with said modulating signals to produce a plurality to modulated carrier instances, and summing the modulated carrier instances and transmitting the result of said summation~~according to claim 35~~, the receiver comprising:

a ~~rf~~ radio frequency ~~processing means for producing~~processing unit configured to produce a baseband signal, comprising components corresponding to the modulating signals, from a received ~~rf~~ radio frequency signal; and

~~processing means for processing~~a processing unit configured to process the baseband signal by processes ~~adapted~~configured to extract the data from each of the modulating signals.

93. (Currently Amended) A receiver according to claim 92, wherein ~~the processing means~~the processing unit ~~combines~~ is configured to combine the extracted data bits into a single data signal.

94. (Currently Amended) A receiver according to claim 92, wherein ~~the processing means~~the processing unit ~~maps~~ is configured to map the outputs of said

processes onto a transmitted parallel bit pattern using a maximum likelihood algorithm and ~~outputting~~ to output said parallel bit pattern.

95. (Currently Amended) A receiver according to claim 94, wherein ~~the processing means~~the processing unit ~~combines~~ is configured to combine the extracted data bits into a single data signal.

96. (Currently Amended) A receiver according to claim 92, wherein at least all but one of said processes comprises:

phase modulating the baseband signal by the inverse of a respective one of said cyclic signal to produce a first signal;

phase modulating instances of the first signal by respective cyclic signals of the form $e^{j2\pi nP/L}$ where P comprises the set of values in the range 0, ..., L-1, and L is the length of the second code to produce L second signals;

filtering each of said second signals with a filter having a transfer function ~~which~~that is the inverse of the first code to produce respective third signals; and

correlating the third signals with corresponding reference signals and summing the results of ~~the said~~the correlations.

97. (Currently Amended) A receiver according to claim 96, wherein ~~the processing means~~the processing unit ~~combines~~ is configured to combine the extracted data bits into a single data signal.

98. (Currently Amended) A receiver according to claim 96, wherein ~~the processing means~~the processing unit ~~maps~~ is configured to map the outputs of said processes onto a transmitted parallel bit pattern using a maximum likelihood algorithm and ~~outputting~~ to output said parallel bit pattern.

99. (Currently Amended) A receiver according to claim 98, wherein ~~the processing means~~the processing unit ~~combines~~ is configured to combine the extracted data bits into a single data signal.

100. (Currently Amended) A receiver according to claim 92, wherein ~~the processing means~~the processing unit comprises a digital signal processor.

101. (Currently Amended) A mobile phone including ~~a~~ the receiver of claim 92~~, the receiver comprising:~~

~~rf processing means for producing a baseband signal, comprising components corresponding to the modulating signals, from a received rf signal; and~~

~~processing means for processing the baseband signal by processes which extract data from each of the modulating signals~~.

102-109 (Cancelled)

110. (Currently Amended) A base station of a mobile phone network including ~~a~~ the receiver of claim 92~~, the receiver comprising:~~

~~rf processing means for producing a baseband signal, comprising components corresponding to the modulating signals, from a received rf signal; and~~

~~processing means for processing the baseband signal by processes adapted to extract the data from each of the modulating signals~~.

111-118 (Cancelled)

119. (Currently Amended) A mobile phone network including a base station in communicative relation to a plurality of mobile phones, the base station including a receiver comprising:

a ~~rf~~ radio frequency ~~processing means for producing~~processing unit configured to produce a baseband signals, comprising components corresponding to the modulating signals, from a received ~~rf~~ radio frequency signal, and

~~processing means for processing~~a processing unit configured to process the baseband signal by processes ~~adapted~~configured to extract the data from each of the modulating signals; and each mobile phone including a transmitter comprising:

a source of digital data to be transmitted to a remote station as a plurality of parallel bitstreams;

a first ~~means for phase modulating~~phase modulating unit configured to phase modulate said bitstreams with respective orthogonal or substantially orthogonal spectrum spreading signals to produce a plurality of modulating signals;

a second ~~means for phase modulating~~phase modulating unit configured to phase modulate respective instances of a carrier with said modulating signals to produce a plurality to modulated carrier instances; and

a ~~summer for summing~~summer configured to sum the modulated carrier instances; wherein the mobile phones employ the same carrier frequency and spreading signals for communication with the base station, each mobile phone applying the spreading signals in a time offset manner relative to the ~~ise~~ use of the spreading signals by each of the other mobile phones.

120. (Withdrawn) A method of RS-CTDMA operation in which, for a spreading code of length N=ML,

(a) L orthogonal codes, specified by $\{f_i\} = \{i + \ell * M\}$ $(\ell = 0, \cdots L-1)$ for $i \in [0, M-1]$, are used to transmit up to L data bits parallel for a user in the ith cell;

(b) Users within one cell are time-offset by at least L chips to avoid or reduce intracell interuser interference; and

(c) M orthogonal spectral groups are used in difference cells.

121. (New) A transmitter, comprising:

digital data source means for providing digital data to be transmitted to a remote station as a plurality of parallel bitstreams;

first means for phase modulating said bitstreams with respective orthogonal or substantially orthogonal spectrum spreading signals to produce a plurality of modulating signals;

second means for phase modulating respective instances of a carrier with said modulating signals to produce a plurality to modulated carrier instances; and

summing means for summing the modulated carrier instances.

122. (New) A receiver for receiving a signal produced by a method comprising providing digital data to be transmitted to a remote station as a plurality of parallel bitstreams, phase modulating said bitstreams with respective orthogonal or substantially orthogonal spectrum spreading signals to produce a plurality of modulating signals, phase modulating respective instances of a carrier with said modulating signals to produce a plurality to modulated carrier instances, and summing the modulated carrier instances and transmitting the result of said summation, the receiver comprising:

radio frequency processing means for producing a baseband signal, comprising components corresponding to the modulating signals, from a received radio frequency signal; and

processing means for processing the baseband signal by processes configured to extract the data from each of the modulating signals.

123. (New) A mobile phone network including a base station in communicative relation to a plurality of mobile phones, the base station including a receiver comprising:

radio frequency processing means for producing a baseband signals, comprising components corresponding to the modulating signals, from a received radio frequency signal, and

processing means for processing the baseband signal by processes configured to extract the data from each of the modulating signals; and each mobile phone including a transmitter comprising:

digital data source means for providing digital data to be transmitted to a remote station as a plurality of parallel bitstreams;

first means for phase modulating said bitstreams with respective orthogonal or substantially orthogonal spectrum spreading signals to produce a plurality of modulating signals;

second means for phase modulating respective instances of a carrier with said modulating signals to produce a plurality to modulated carrier instances; and

summing means for summing the modulated carrier instances; wherein the mobile phones employ the same carrier frequency and spreading signals for communication with the base station, each mobile phone applying the spreading signals in a time offset manner relative to the use of the spreading signals by each of the other mobile phones.

124. (New) The method of claim 35, wherein the spreading signals comprise a common finite spreading sequence.

125. (New) The method of claim 84, wherein the spreading signals comprise a common finite spreading sequence.

126. (New) The transmitter of claim 45, wherein the spreading signals comprise a common finite spreading sequence.

127. (New) The transmitter of claim 121, wherein the spreading signals comprise a common finite spreading sequence.

128. (New) The receiver of claim 92, wherein the spreading signals comprise a common finite spreading sequence.

129. (New) The receiver of claim 122, wherein the spreading signals comprise a common finite spreading sequence.

130. (New) The mobile phone network of claim 119, wherein the spreading signals comprise a common finite spreading sequence.

131. (New) The mobile phone network of claim 123, wherein the spreading signals comprise a common finite spreading sequence.